

Features

- ◆ Low On-Resistance
- ◆ Fast Switching
- ◆ 100% Avalanche Tested
- ◆ Repetitive Avalanche Allowed up to Tjmax
- ◆ Lead-Free, RoHS Compliant

Description

VS3060AD designed by the trench processing techniques to achieve extremely low on-resistance. Additional features of this design are a 150°C junction operating temperature, fast switching speed and improved repetitive avalanche rating . These features combine to make this design an extremely efficient and reliable device for use in Motor applications and a wide variety of other applications.

Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only; and functional operation of the device at these or any other condition beyond those indicated in the specifications is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. The thermal resistance and power dissipation ratings are measured under board mounted and still air conditions. Ambient temperature (TA) is 25°C, unless otherwise specified.

V_{DS}	30	V
$R_{DS(on), Typ}$	9.0	mΩ
I_D	60	A



Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{GS}	Gate-Source Voltage		±20	V
V _{(BR)DSS}	Drain-Source Breakdown Voltage		30	V
T _J	Maximum Junction Temperature		150	°C
T _{STG}	Storage Temperature Range		-55 to 150	°C
I _S	Diode Continuous Forward Current	T _C =25°C	50	A
Mounted on Large Heat Sink				
I _{DM}	Pulse Drain Current Tested (Sillicon Limit)	T _C =25°C	200	A
I _D	Continuous Drain current@V _{GS} =10V (See Fig2)	T _C =25°C	60	A
P _D	Maximum Power Dissipation	T _C =25°C	50	W
R _{θJC}	Thermal Resistance-Junction to Case		2.4	°C/W
Drain-Source Avalanche Ratings				
EAS	Avalanche Energy, Single Pulsed ②		81	mJ

Symbol	Parameter		Condition	Min.	Typ.	Max.	Unit
Static Electrical Characteristics @ T _J = 25°C (unless otherwise stated)							
V _{(BR)DSS}	Drain-Source Breakdown Voltage		V _{GS} =0V I _D =250μA	30	--	--	V
I _{DSS}	Zero Gate Voltage Drain Current(T _c =25°C)		V _{DS} =24V,V _{GS} =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T _c =125°C)		V _{DS} =24V,V _{GS} =0V	--	--	100	μA
I _{GSS}	Gate-Body Leakage Current		V _{GS} =±20V,V _{DS} =0V	--	--	±100	nA
V _{GS(TH)}	Gate Threshold Voltage		V _{DS} =V _{GS} ,I _D =250μA	1.0	1.8	3.0	V
R _{DS(ON)}	Drain-Source On-State Resistance①		V _{GS} =10V, I _D =20A	--	9.0	11	mΩ
R _{DS(ON)}	Drain-Source On-State Resistance①		V _{GS} =5V, I _D =10A	--	12	15	mΩ
Dynamic Electrical Characteristics @ T _J = 25°C (unless otherwise stated)							
C _{iss}	Input Capacitance		V _{DS} =15V,V _{GS} =0V, f=1MHz	--	1550	--	pF
C _{oss}	Output Capacitance			--	190	--	pF
C _{rss}	Reverse Transfer Capacitance			--	135	--	pF
Q _g	Total Gate Charge	V _{GS} =10V	V _{DS} =15V,I _D =20A, V _{GS} =10V	--	32	--	nC
		V _{GS} =4.5V		--	15.5	--	nC
Q _{gs}	Gate-Source Charge			--	3.5	--	nC
Q _{gd}	Gate-Drain Charge			--	6.8	--	nC
Switching Characteristics							
t _{d(on)}	Turn-on Delay Time		V _{DD} =15V, I _D =10A, R _G =6.8Ω, V _{GS} =10V	--	10.5	--	nS
t _r	Turn-on Rise Time			--	13	--	nS
t _{d(off)}	Turn-Off Delay Time			--	12	--	nS
t _f	Turn-Off Fall Time			--	10	--	nS
Source- Drain Diode Characteristics@ T _J = 25°C (unless otherwise stated)							
I _{SD}	Source-drain current(Body Diode)		T _c =25°C	--	--	60	A
V _{SD}	Forward on voltage		I _{SD} =30A,V _{GS} =0V	--	--	1.3	V
t _{rr}	Reverse Recovery Time		T _J =25°C,I _{sd} =10A, V _{GS} =0V	--	18	--	nS
Q _{rr}	Reverse Recovery Charge		di/dt=100A/μs	--	10	--	nC

NOTE:

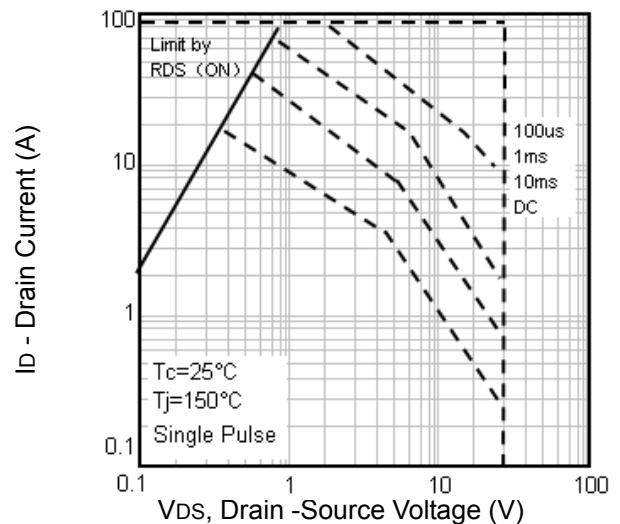
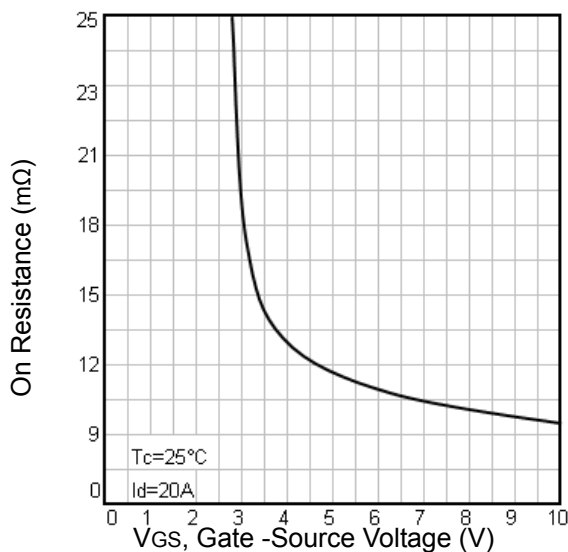
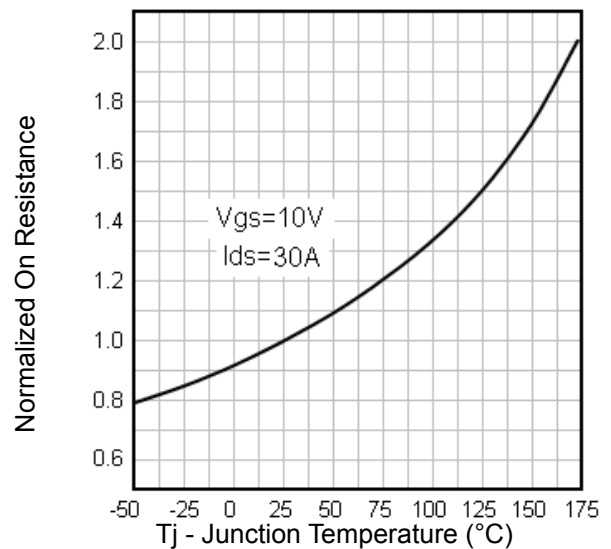
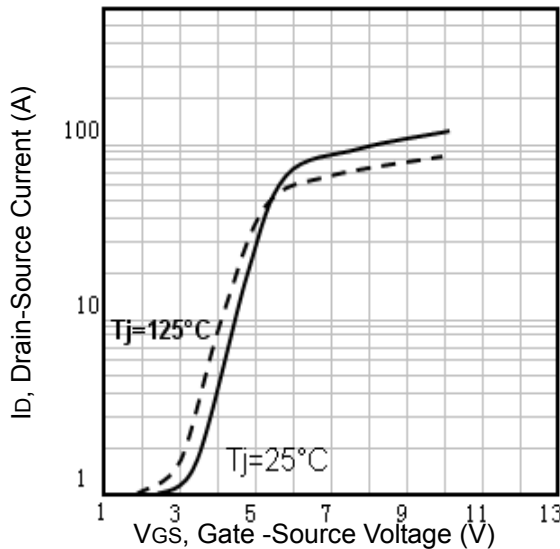
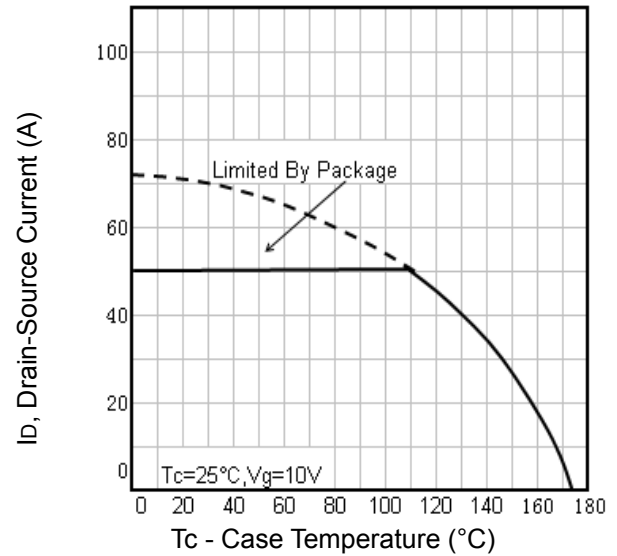
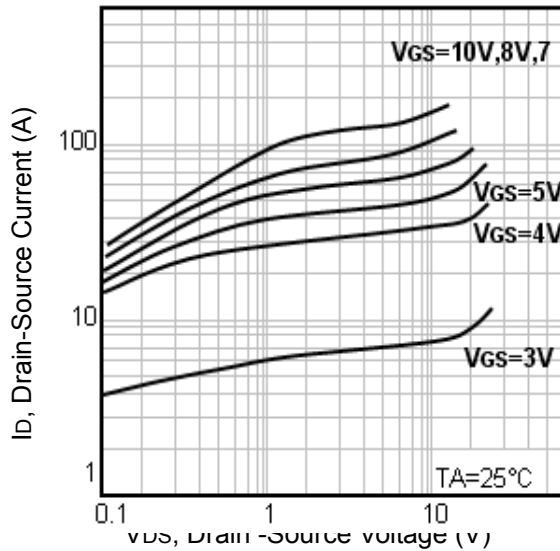
① Pulse width ≤ 300μs; duty cycles ≤ 2%.

② Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH, R_G = 25Ω, I_{AS} = 16A, V_{GS} = 10V.

Part not recommended for use above this value

③ Repetitive rating; pulse width limited by max. junction temperature.

Typical Characteristics



Typical Characteristics

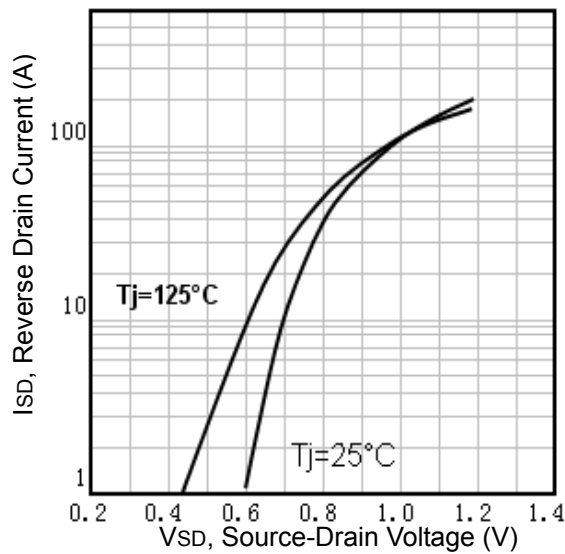


Fig7. Typical Source-Drain Diode Forward Voltage

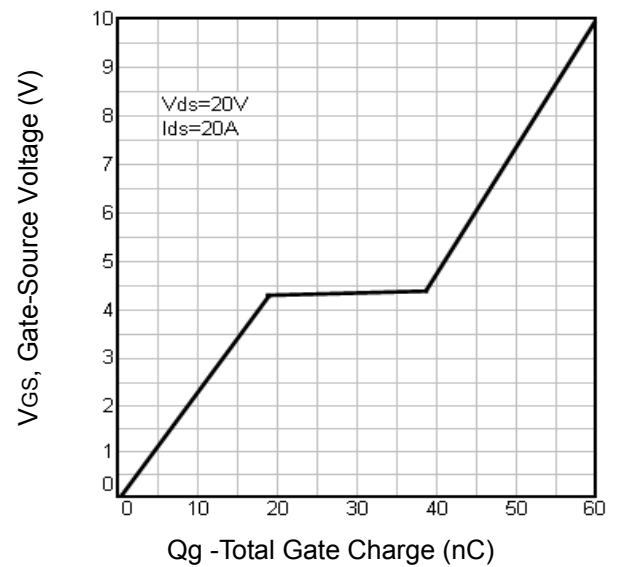


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

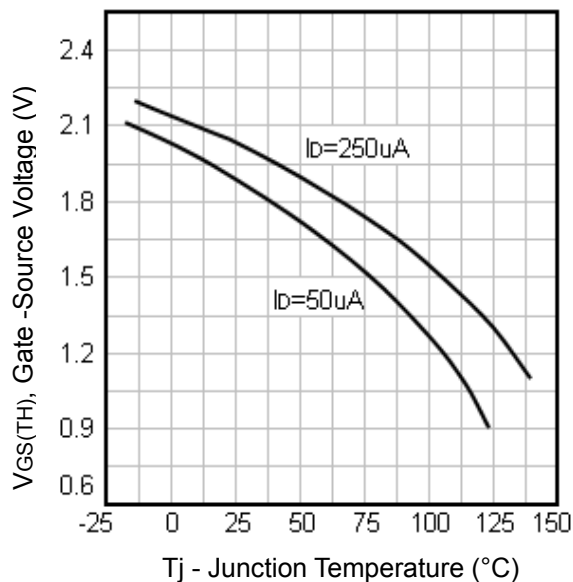


Fig9. Threshold Voltage Vs. Temperature

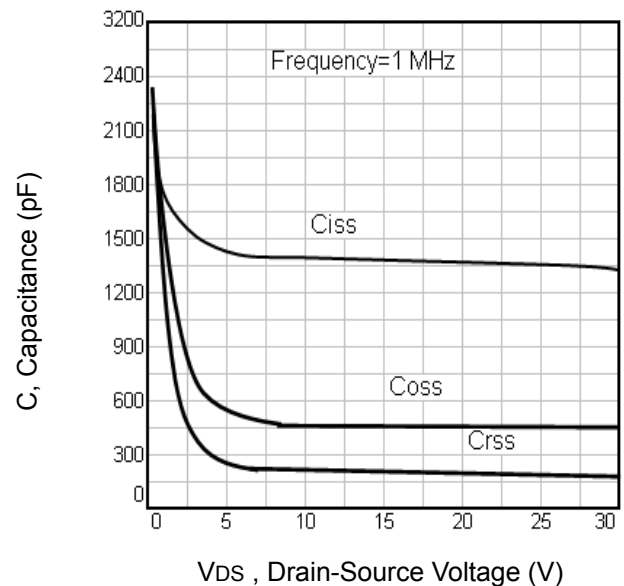


Fig10. Typical Capacitance Vs. Drain-Source Voltage

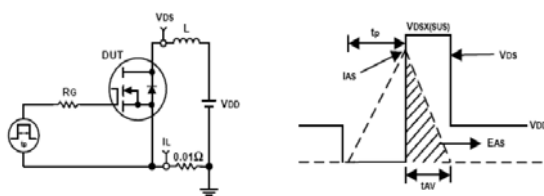


Fig11. Unclamped Inductive Test Circuit and waveforms

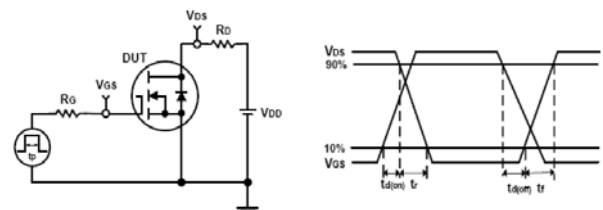
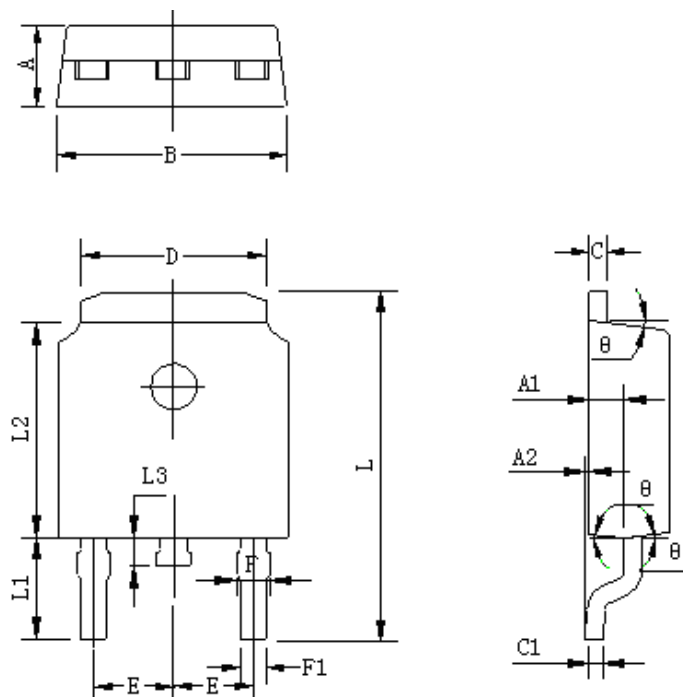


Fig12. Switching Time Test Circuit and waveforms

TO-252 Package Outline



TO-252 Dimensions (Unit:mm)

Symbol	Min	Nom	Max
A	2.25	2.3	2.35
A1	0.96	1.01	1.06
A2	0.05	0.1	0.15
B	6.05	6.6	6.65
C	0.46	0.508	0.580
C1	0.508	0.508	0.508
D	5.31	5.32	5.33
E	2.186	2.286	2.386
F	0.075	0.085	0.095
F1	0.660	0.76	0.860
L	9.80	9.825	10.40
L1	2.9REF		
L2	6.05	6.1	6.15
L3	0.79	0.8	0.81
θ	7°	7°	7°

Order Information

Product	Marking	Package	Packaging	Min Unit Quantity
VS3060AD	VS3060AD	TO-252	2500PCS/Reel	5000PCS
VS3060AD	VS3060AD	TO-252	80PCS/Tube	2000PCS

Customer Service

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